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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/734,713	12/12/2003	Raymond G. Beausoleil	200311116-1	2342
22879	7590	09/06/2006	EXAMINER	
HEWLETT PACKARD COMPANY P O BOX 272400, 3404 E. HARMONY ROAD INTELLECTUAL PROPERTY ADMINISTRATION FORT COLLINS, CO 80527-2400			TRAN, MAI T	
			ART UNIT	PAPER NUMBER
			2129	

DATE MAILED: 09/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/734,713

Applicant(s)

BEAUSOLEIL ET AL.

Examiner

Mai T. Tran

Art Unit

2129

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### **REMARKS**

Applicants' amendment dated June 14, 2006 responding to the March 14, 2006 Office Action provided in the rejection of claims 1-24, wherein claim 1 has been amended. Claims 1-24 remain pending in the application and which have been fully considered by the examiner.

### **CLAIM REJECTIONS - 35 USC § 101**

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims **1-24** are rejected under 35 U.S.C. § 101 because the claimed invention is directed to non-statutory subject matter.

The claimed invention must be for a practical application by:

1. transforming (physical thing) or
2. having the FINAL RESULT (not the steps) achieve or produce a useful (specific, substantial, AND credible) concrete (substantially repeatable/non-unpredictable), AND tangible (real world/non-abstract) result.

A claim that is so broad that it reads on both statutory and non-statutory subject matter, must be amended, and if the specification discloses a practical application but the claim is broader than the disclosure such that it does not require the practical application, then the claim must be amended.

In the present case, independent claim 1 is directed to a method comprising:  
“constructing a state vector ..., selecting 2N operators to be respectively applied to the 2N qubits ..., applying each of the 2N operators ..., evaluating a final state vector ... An invention that is a combination of the above recited steps has no specific purpose or use. Moreover, independent claim 10 is directed to a system where all of the elements would reasonably be interpreted by one of ordinary skill in the art in light of the disclosure as software, such system is software per se.

The Examiner reads the claims carefully to search for limitations to practical applications and finds no final result achieved or produced a useful, concrete and tangible result. Therefore, it is not statutory.

### CLAIM REJECTIONS - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-24 are rejected under 35 U.S.C. §112, first paragraph because current case law (and accordingly, the MPEP) require such a rejection if a §101 rejection is given because when Applicant has not in fact disclosed the practical application for the invention, as a matter of law there is no way Applicant could have disclosed *how* to practice the *undisclosed* practical application. This is how the MPEP puts it:

(“The how to use prong of section 112 incorporates as a matter of law the requirement of 35 U.S.C. §101 that the specification disclose as a matter of fact a practical utility for the invention.... If the application fails as a matter of fact to satisfy 35 U.S.C. §101, then the application also fails as a matter of law to enable one of ordinary skill in the art to use the invention under 35 U.S.C. §112.”); In re Kirk, 376 F.2d 936, 942, 153 USPQ 48, 53 (CCPA 1967) (“Necessarily, compliance with § 112 requires a description of how to use

presently useful inventions, otherwise an applicant would anomalously be required to teach how to use a useless invention.”) See, MPEP 2107.01(IV), quoting *In re Kirk* (emphasis added).

Therefore, claims 1-24 are rejected on this basis.

## **RESPONSE TO ARGUMENTS**

### **Rejection under 35 U.S.C. §101 and rejection under 35 U.S.C. § 112, first paragraph**

Applicants’ arguments filed have been fully considered but they are not persuasive.

Specifically, applicants argues that:

#### **Argument 1**

The process of claim 1 is not directed to merely abstract ideas or a mathematical algorithm because claim 1 requires players to make selections. Further, the process of claim1 provides the useful, concrete, and tangible results of designating whether players will cooperate with or defect from a cooperative effort. Applicants’ specification, for example, in paragraphs [0002], [003], and [0016] further illustrates the usefulness of such processes. In accordance with the holding in *State Street Bank & Trust Co. v. Signature Fin. Group, Inc.*, 149 F.3d 1368, claim 1 is directed to statutory subject matter under 35 U.S.C. §101 at least because claim 1 recites a process that produces a useful, concrete, and tangible result.

First, since the term “players” was not further defined in the claims, the Examiner was giving each term in the claims its broadest reasonable interpretation consistent with the specification. During patent examination, the claims are given the broadest reasonable interpretation consistent with the specification. See *In re Morris*, 127 F.3d 1048, 44 USPQ2d 1023 (Fed. Cir. 1997). Upon consideration of claim 1 in light of the description, it is found that the combination of recited steps constitute a method that is carrying out a “game theory” or “game strategies” that apply “quantum operators” to implement a “quantum game”. “Game theory” offers mathematical tools for analyzing games. Further, all of the limitations cited in

Art Unit: 2129

claim 1 such as “state vector”, “2N operators”, “entangled qubits”, and “players” are disclosed theoretically or mathematically (see specification, paragraphs [0013], [0014], [0015], [0016]). Therefore, the Examiner’s broadest reasonable interpretation of the claimed invention is pure abstract ideas, mathematical algorithms, and software per se.

Second, in this argument, it is noted that Applicants seek to read limitations from the specification into the claims. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Third, Examiner will cite the holding from *State Street*:

Today we hold that *the transformation of data, representing discrete dollar amounts, by a machine through a series of mathematical calculations into a final share price*, constitutes a practical application of a mathematical algorithm, formula, or calculation because it produces ‘a useful, concrete and tangible result’ -- *a final share price momentarily fixed for recording purposes and even accepted and relied upon by regulatory authorities and in subsequent trades*. (emphasis added) *State Street Bank* at 1601.

The Court was *very specific* in its definition of the new *practical application*. Looking at Applicants’ claims, Examiner interpreted them to have a “mathematical theory” carrying out by a “mathematical algorithm” that manipulated “mathematical vector” in a “mathematical space” and not “physical space”. Applicants disclose no manipulation of specific data representing physical objects or activities (pre-computer activity), nor do applicants disclose any specific independent physical acts being performed by the invention (post-computer activity).

On these bases, Applicants have not shifted their burden of showing that their claims are statutory and Examiner's rejection of those claims STANDS.

## Argument 2

Art Unit: 2129

Claim 6 provides further statutory subject matter by reciting, “software executed in a classical computer performs the step of applying the operators to the state vector.” Accordingly, claim 6 is clearly not simply directed to abstract ideas, but instead recites physical implementation of a process in a computer.

Claim 7 provides further statutory subject matter by reciting, “constructing the state vector comprises setting a system in a quantum state corresponding to the state vector.” Claim 7 thus recites manipulation of physical systems and not just abstract ideas.

Claims 8 and 9 similarly provide additional statutory subject matter by reciting physical implementations of process steps.

Applicants are reminded that a claim invention must be “**limited to**” a practical application not merely related to them. According to MPEP 2106, the claimed invention as a whole must accomplish a practical application. That is, it must produce a “useful, concrete and tangible result.” State Street, 149 F.3d at 1373, 47 USPQ2d at 1601-02. The purpose of this requirement is to limit patent protection to inventions that possess a certain level of “**real world**” value, as opposed to subject matter that represents nothing more than an idea or concept, or is simply a starting point for future investigation or research (Brenner v. Manson, 383 U.S. 519, 528-36, 148 USPQ 689, 693-96); In re Ziegler, 992, F.2d 1197, 1200-03, 26 USPQ2d 1600, 1603-06 (Fed. Cir. 1993)) (emphasis added).

Upon consideration of claims 6, 7, 8, and 9 in light of the description, it is found that all of the limitations cited above such as “operator”, “state vector”, “quantum state” are disclosed theoretically or mathematically (see specification, paragraphs [0013], [0014], [0015], [0016]). Therefore, the Examiner’s broadest reasonable interpretation of the claimed invention is pure abstract ideas, mathematical algorithms, and software per se.

On this basis, Applicants have not shifted their burden of showing that their claims are statutory and Examiner's rejection of those claims STANDS.

### **Argument 3**

Independent claim 10 is statutory subject matter because it recites a new and useful machine. In particular, claim 10 recites, "A system comprising: a source of multiple channels of entangled photon pairs; a plurality of stations ...; a first optical network ...; and a measurement system coupled to measure the states of the photons after delivery to the stations." The system is useful because it can be used, for example, for implementation of a quantum public goods game that allocates players' contributions to provide a public good. Further, the structure recited in claim 10 is very concrete, so that the case law and holdings regarding the manipulation of abstract ideas do not suggest that claim 10 is directed non-statutory subject matter.

First, in this argument, it is noted that the features upon which applicants rely (i.e., for implementation of a quantum public goods game that allocates players' contributions to provide a public good) are not recited in the rejected claims. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Second, in response to applicants' argument that "the structure recited in claim 10 is very concrete." Mere conclusory statement does not convey applicants' rationale such that the Examiner can respond in a meaningful manner.

On this basis, Applicants have not shifted their burden of showing that their claims are statutory and Examiner's rejection of those claims STANDS.

### **CONCLUSION**

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).



A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

#### **CORRESPONDENCE INFORMATION**


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mai T. Tran whose telephone number is (571) 272-4238. The examiner can normally be reached on M-F 9:00am-- 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Vincent can be reached on 571-272-3080. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2129

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

M.T.T  
Patent Examiner  
Date: 9/01/2006

  
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